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DRIVEN WELL SUPPLY OF MUSCATINE, IOWA¹

BY WILLIAM MOLIS

The water works of the city is situated on what is called Muscatine Island which is some 20 miles in area. The soil underlying is almost wholly sand and gravel, varying in depth from 20 to 60 feet. The wells are down about 50 feet, passing through top soil 3 feet, red clay 5 feet, red sand and gravel 8 feet, sand and gravel 18 feet, solid gravel down to 27 feet. Coarse sand and gravel to 42 feet, 8 feet gravel and sand with large pebbles at 51 feet, blue clay to 57 feet, soapstone clay to 59 feet, sandstone to 62 feet.

Before locating the plant on these grounds tests were made for some six months indicating the rise and fall with the Mississippi River which is some 1000 feet from the wells. The tests were made about 1 mile on each side of the location where the plant was supposed to be built. In addition a seven days test was made with a pump of about 1,000,000 gallons daily capacity throwing the water from the well into the river.

This was one of the most elaborate tests of ground water supplies ever undertaken. You will see in Hubbard and Kiersted's book on water supplies a full description of it.

Twenty inch suction pipe, 1500 feet long. Six inch wells on each side; staggered 150 feet apart. We have pumped at the rate of 6,000,000 gallons per 24 hours and only lowered the ground water 3 to 4 feet, an 8 inch casing was first driven down and then a 6 inch pipe was put on. One feature in connecting up this pipe was that the pipe was cut in place, using a Toledo pipe cutter in the trench without removing the six inch pipe.

Each well has a gate attached so it can be cut out in the line. All this work was done by the water works employees. There are also in the line tees of the full size of the suction pipe for future extension. A 20 inch gate was put in as a safety measure. A large air chamber is set on this line near the pump house, where an air pump is connected up to keep the line free from air.

¹ Presented at meeting of Iowa Section, December 3, 1915.

An air and water indicator in the pump house shows us just where the air and water are in the suction line.

The analysis of the supply shows it to be of a most excellent quality. In fact there has not been a case of disease in the city for many years which could be laid to the water supply.

The temperature of the water is about 50 degrees Fahrenheit. There are drinking fountains scattered all over the city which remain at about the same temperature the year around.

The average rainfall for this section is about 40 inches. There has been plenty of water in the seasons of least rainfall and on occasions of maximum pumpage the wells were lowered but a few feet. Other features in this work are the strainers supplying these wells. They consist of three sets of 9 slots each, cut vertically in a piece of wrought iron well casting, one set of slots were $\frac{3}{8}$ inch wide and 24 inches long, the second set $\frac{3}{8}$ inch wide and 21 inches long, and the third set $\frac{1}{4}$ inch wide and 33 inches long, each set being separated by 8 or 10 inches of solid metal. The length of the strainer is about 8 feet. The area of openings about 220 square inches or about 4 times the area of the 6 inch pipe. The bottom of the pipe was plugged, and each well was pumped until there was no visible sand coming up. Such strainers should be used with caution. If there is coarse gravel they will work well but should there be fine sand, it is liable to work into the slots and give a great deal of trouble by the fine material coming in and cutting out the pumps.